specification at page 12, lines 11-16, where it discusses how the air flow rate over the thermistor as calculated by the processor. Accordingly, it is clear that the title is descriptive of the applicants' claimed invention.

The Examiner rejects claims 1-10 under 35 U.S.C. §112 second paragraph, stating that it is not clear how the temperature dependent resistor device is also included as an element in the first and second circuits.

It is clear in the claims that the first variable resistance leg of the first circuit includes the temperature dependent resistor device and that the second variable resistor leg of the second circuit also includes the temperature dependent resistor device. Lines 6 and 7 of claim 1 recite "a first variable resistance leg including <u>the temperature dependent resistor device</u>", and lines 12 and 13 of claim 1 recite "a second variable resistance leg including <u>the temperature dependent resistor device</u>". Thus, the recited element "a temperature dependent resistor device" is included both in the first variable resistance leg of the first circuit and also in the second variable resistance leg of the second circuit. Accordingly, claim 1 is sufficiently definite.

The Examiner rejects claims 1-17 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,394,746 to *Williams* in view of U.S. Patent No. 5,629,482 to *Vaitkus et al.*

In contrast to the applicants' claimed invention, *Williams* and *Vaitkus et al.* do not teach or suggest an air flow sensor configured to apply a voltage to a temperature dependent resistor device until it reaches <u>a first temperature</u>; allows it cool until it reaches <u>a second temperature</u>; and then measures <u>the time</u> it takes the temperature dependent resistor device to <u>change</u> from the first <u>temperature</u> to the second temperature <u>to determine</u> the <u>heat loss rate</u> of the temperature dependent resistor device. Also, in contrast to the applicants' claimed invention, *Williams* and

Vaitkus et al. do not teach or suggest a temperature dependent resistor device connected to *both* of the variable resistance legs, nor do *Williams* and *Vaitkus et al.* teach or suggest first and second comparators. Additionally, the combination of *Williams* and *Vaitkus et al.* teaches away from the applicants' claimed invention by requiring an analog to digital converter. Finally, one skilled in the art would not combine *Williams* and *Vaitkus et al.*

Williams teaches that current passing through a platinum wire sensor causes the sensor to be heated so that its resistance changes. *Williams'* platinum wire is held at a constant temperature interval above the ambient air temperature irrespective of airflow by adjusting the current such that the potential difference between the circuit nodes 12 and 13 remains at substantially zero. *Williams* does not allow it the temperature dependent device to cool down, and *Williams* fails to suggest monitoring the temperature change or the time it takes for the temperature change. See *Williams* at column 3, lines 30-41.

Vaitkus et al. teaches two identical thin films/sensors, and each one is a temperature dependent device. See, e.g., *Vaitkus et al.* at column 16, lines 22-23, as well as column 3, lines 1-24, 48-53, and Fig. 1. *Vaitkus et al.* then places one thin film/sensor in a fluid and one out of the fluid so that the output of each sensor differs only relative to the flow rate. See *Vaitkus et al.* at column 16, lines 39-53:

> In brief, two sensors are identical and the circumstances different only in whether or not there are in contact with a fluid ... on comparing the output of the two sensors ... only the output component corresponding to the flow rate can be obtained which does not pertain to other parameters.

In summary, *Williams* does not suggest changing the temperature of a temperature dependent device and *Vaitkus et al.* does not measure the temperature change of a single temperature dependent device. Instead, in *Vaitkus et al.* the differences between two temperature

dependent devices placed in different environments is determined. Neither *Williams* nor *Vaitkus et al.* suggest the use of the period of time it takes for the temperature change in a temperature dependent device as a way of determining the heat loss rate, and neither of the cited references teach or suggest a temperature dependent resistor device connected to first and second variable resistance legs of two circuits.

Accordingly, it is clear that even the combination of *Williams* and *Vaitkus et al.* does not teach determining air flow by measuring the time it takes for a temperature dependent resistor device in a circuit to cool to a second temperature, as claimed by the applicants.

Additionally, in contrast to the applicants' claimed invention, *Vaitkus et al.* does not disclose a second comparator 408. Rather, *Vaitkus et al.* discloses amplifiers 404 and 408, with the CPU 410 acting as the comparator to compare the outputs from the two sensors and to compute the output component dependent only on the desired parameter. See, e.g., *Vaitkus et al.* at column 17, lines 24-27.

Moreover, *Vaitkus et al.* teaches away from the applicants' claimed invention in that *Vaitkus et al.* requires an analog to digital converter 409. See *Vaitkus et al.* column 10, lines 45-48 and column 17, lines 1 and 2, as well as Fig. 4. One of the objects of the applicants' claimed invention is to provide an air flow sensor which does not require an (expensive) analog to digital converter. See, e.g., the specification at page 4, lines 19-21, as well as page 5, lines 11-22.

Other advantages of the applicants' invention are that the applicants' claimed invention is, inter alia, accurate, easy to design and implement, and is voltage independent. See, e.g., the specification at page 4, line 19 through page 5, line 10.

Finally, there is no support or motivation to combine the cited references. *Vaitkus et al.*

requires two sensors while the air flow sensor of *Williams* is essentially self-contained in a wire in one circuit. *Vaitkus et al.* uses the principals of thermo-electromotive effect of materials by using thin films having different materials at different temperatures, while *Williams* uses electronic circuitry.

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984).

In sum, the cited references do not anticipate, teach, or suggest the applicants' claimed invention as a whole. Accordingly claim 1, and the dependent claims 2-10, are allowable over the cited references.

Claim 11 recites an air flow sensor comprising a temperature dependent resistor device; means for applying a voltage to the temperature dependent resistor device until it reaches a first temperature; means for determining when the temperature dependent resistor device then cools to a second temperature; and means for timing the period of time it takes the temperature dependent device to change from the first temperature to the second temperature to determine the heat loss rate of the temperature dependent resistor device.

As discussed, neither *Williams* nor *Vaitkus et al.*, separately or together, disclose teach or suggest means for applying a voltage to the temperature dependent resistor device until it reaches a first temperature; means for determining when the temperature dependent resistor device then cools to a second temperature; and means for timing the period of time it takes the temperature dependent device to change from the first temperature to the <u>second</u> temperature to determine the heat loss rate

of the temperature dependent resistor device. Instead, *Williams* teaches holding the air flow sensor 4 at a constant temperature by adjusting the current and looking to the output voltage as a representation of the air flow rate. See *Williams* column 3, lines 3-57. *Vaitkus et al.* does not disclose, teach or suggest inter alia, means for timing the period of time it takes the temperature dependent device to change from the first temperature to the second temperature to determine the heat loss rate of the temperature dependent resistor device. See, e.g., *Vaitkus et al.* at column 2, lines 39-67.

Accordingly, claim 11, and claims 12 and 13 which depend from claim 11 are not obvious over *Williams* and *Vaitkus et al.*, and are therefore in condition for allowance.

Claim 14 recites a method of determining the heat transfer rate of a temperature dependent resistor device, the method comprising heating the temperature dependent resistor device to a first temperature; allowing the temperature dependent resistor device to cool to a second temperature; measuring the period of time it takes for the temperature dependent resistor device to cool to the second temperature; and calculating the rate of heat transfer of the temperature dependent resistor device based on the measured period of time.

For reasons stated above, claim 14 is not anticipated by or obvious over *Williams* and *Vaitkus et al.* The cited references do not disclose, teach or suggest heating the temperature dependent resistor device, allowing it to cool to a second temperature, measuring the period of time for cooling, and calculating the rate of heat transfer based on the measurement of time. Claims 15-17 depend directly or indirectly from claim 14, and therefore are also in condition for allowance.

Conclusion

Accordingly, claims 1-17 are allowable. Each of the Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that the application is in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts, (781) 890-5678.

Respectfully submitted,

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